METHODS FOR IMPROVING THE HANDLING OF PRODUCE IN RETAIL STORES

Lecture Notes For Use With 2 x 2 Slides and Vu-Graph Prints
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The produce department is the third largest department in most super markets, ranking in volume of sales after the grocery and meat departments. In most super markets produce accounts for 10 to 12 percent of the store's sales volume and because of its perishability, the margin to handle it is one of the highest in the store.

Unloading - Receiving Produce in Retail Food Stores

The unloading and receiving of produce is the first handling operation performed at the retail store level. The cost of this function is less than 5 percent of the total cost of handling produce in the retail store.

Methods of unloading and receiving produce at retail food stores range from carrying produce into the store by hand to a completely palletized operation where individual cases are not handled. (PH-2x2-1) Since no two stores are exactly alike and all firms and managers have their own views as to the methods to use, there is little standardization of prodedures.

It is recognized that part of the produce receiving operation is the preparation of the backroom. Aisles must be cleared and space must be provided for the storage of merchandise. However, it was virtually impossible to define the extent to which this preparation should be charged to receiving and which to normal housekeeping. Since the amount of preparation varies from store to store, depending on store layout, the time required to perform this function was excluded from all standards.

Studies made in 15 super markets by the Retailer-Wholesaler Branch, AMS, USDA, showed that produce is most efficiently unloaded and received by being placed on pallets in the warehouse (PH-2x2-4) and left on the same pallets until it is used in the store. (PH-2x2-5) In this study, 163 cases per man-hour were handled by this method. (PH-VG-1) A loading dock at the store is necessary in order to take full advantage of pallet handling.

Where the stores did not have loading docks, the most efficient unloading and receiving was by use of semi-live skids with an average capacity of 20 cases to haul in the load. (PH-2x2-2) Production including loading time was 81 cases per man-hour. (PH-VG-1)

In some stores, the produce was unloaded into night receiving rooms. The most efficient operation of this type employed a 2-man crew and conveyor equipment. (PH-2x2-3) Including the time required to store these cases not used during the morning set-up, the standard for this operation was 76 cases per man-hour. (For more detailed information on this subject consult MRR-129, "Unloading and Receiving Produce in Retail Food Stores.")

Unloading and Receiving Watermelons

None of the preceding standards include the handling of watermelons; a separate study was made of watermelon handling in retail stores. In this study the average delivery included about 50 melons weighing between 20 and 30 pounds each. The melons were unloaded outside the produce receiving door by the delivery personnel and were stacked on the ground except when a collapsible rack was used. Four different methods and types of equipment for handling melons were evaluated. (PH-VG-2)*

In one commonly used method, "baskarts" with a capacity of 7 melons were used to haul the melons either to display or to the backroom storage area. In another typical handling method, lettuce or carrot crates were loaded on a platform-type stocking truck and filled with mellons. Two crates on the truck held, on the average, 13 melons. Some stores used 30- by 60-inch semi-live skids for produce receiving and storage. Three crates placed on this type of skid held approximately 21 melons. In each of these 3 methods, the carrier was used only to transport the melons to display or storage. Of these three methods, the use of the semi-live skid with crates was the most productive.

Table 4. Comparative efficiency of 4 methods of unloading and receiving watermelons.

Method	Melons handled per man-hour	Man-hours per 1,000 melons
	Number	Number
Baskart	105	9.6*
Stocking truck	104	9.6*
Semi-live skid with crates	133	7.5*
Semi-live skid with collapsible	220	4.5*

*Make Necessary corrections on (PH-VG-2).

To reduce the number of handlings and to increase the number of melons hauled per trip, a collapsible rack was designed which would fit on the semi-live skids and which could also be used for displaying the watermelons (PH-2x2-6). This rack has an approximate capacity of 50 melons. When used for display, grass mats were draped over each side (PH-2x2-7). Since the rack is collapsible, it requires little space for storage. It also can be used for bulk displays or for displaying potatoes and onions. By this method, melons were handled at the rate of 220 per man-hour compared with 133 by the next most efficient method.

One firm studied uses a combination pallet and rack. This reduces handling to a minimum--the melons are not handled from the time they are loaded in the racks at the warehouse until they are displayed. However, the stores must have truck-bed height loading docks and a pallet jack in order to use the pallet rack.

CITRUS CODER CUTS COSTS

An effective and simple method for individually coding grapefruit and oranges--usually a time-consuming chore in self-service food stores when different sizes or types of the same fruit are offered for sale--has been developed by marketing research specialists of the U. S. Department of Agriculture.

This new method uses a piece of equipment which is called a "citrus coder" by its developers. In store tests, the citrus coder coupled with better handling techniques, cut in half the time normally required to code (mark) and display citrus.

The new equipment is another example of results of USDA marketing research seeking ways to reduce the cost of retailing. Development of the citrus coder was the result of one phase of an overall study being made by the Transportation and Facilities Branch of the Agricultural Marketing Service to lower handling costs in the produce and other departments of retail food stores.

Citrus Differs by Type and Size

During the citrus season, a self-service store commonly stocks 2 or 3 sizes of grapefruit in both white and pink types. At the same time it will stock several sizes of oranges of different types. When these fruits are sold from bulk displays, it is necessary to code (mark) the individual items. Unless they are individually marked, check-out operators are unable to correctly identify and price the citrus fruit. The mark or code may be in the form of lines or crosses, or may be alphabetical or numerical.

The typical price coding operation studied was as follows: One or more crates of citrus were loaded on a stocking truck and moved to the display area. Each row in the crate was then marked with a crayon or grease pencil, an adjustable stamp, or a self-inking porous tip stick stamp. After each row was coded, the units were placed on display. Each piece of citrus was handled twice - coding and displaying. Labor requirements varied according to the number of units per crate, the type of coding equipment, and the methods used. When good handling methods were used, the self-inking stick stamp was slightly faster than the band-type adjustable stamp. It was 14 percent faster for grapefruit and 23 percent faster for oranges than a crayon or grease pencil. (PH-VG-3) For this study it was assumed that the average citrus crate contained 72 grapefruit or 240 oranges.

Some operators code citrus by hand in the backroom to avoid displaying each unit separately and to reduce the congestion in front of the display area while the citrus is coded and displayed. Two 1-1/8-bushel apple boxes were positioned adjacent to a full crate of citrus on the stocking truck. After each

row of citrus was coded, the units were put in the box. Two 1-1/8-bushel boxes, such as eastern apple boxes, will hold a full crate. Smaller size boxes will not permit the double stacking of full boxes unless more than two boxes are used per crate. The citrus may either be coded in advance of requirements and placed in storage or may be moved directly to the display area. The display operation consists of dumping the boxes on the display fixture. Regardless of whether the citrus is coded at the display area or in the backroom, there is little difference in the time requirements. Coding by hand in the backroom is on the average 8 percent more productive than the conventional method for handling oranges but is 4 percent less productive for handling grapefruit.

Equipment Speeds Coding

The citrus coder was developed to eliminate the necessity of individually coding by hand each citrus unit. The coder consists of a hopper, into which the crate of citrus is dumped and a cradle mounted on wheels in which the hopper is positioned (PH-2x2-8). Incorporated in the hopper and extending beyond the hopper are two parallel grooves which serve to track the citrus individually over the coding device. This device consists of two individual stick-type self-inking stamps which are placed in recessed holes at the discharge end of each track. As each piece of fruit comes down the groove, an impression is made on it as it rolls over one of the self-inking stamps. The hopper and the extending tracks are adjustable so that the correct pitch for the citrus can be provided. For example, 46 and 54 size grapefruit require a steeper pitch than a size 288 orange.

As in backroom coding with conventional hand coding methods, two apple boxes of 1-1/8-bushel capacity were used for each crate of coded citrus. This type box is recommended because: 1) The produce department normally has an ample supply of these boxes; 2) They can be double stacked; and 3) They have a wood strap across the two ends which provides a convenient handhold. The two empty boxes are placed side by side on the floor at the discharge end of the citrus coder chutes. A full crate of citrus is placed diagonally on the hopper as illustrated in figure 4. As the operator dumps the citrus in the hopper, he watches for poor quality or off-size citrus and removes them as they roll down the chutes. An approximately equal amount of citrus should be dumped into each of the two chutes. The amount of citrus in each of the two apple boxes is then equalized and the boxes are stacked on a skid or truck ready to be taken for displaying.

Different Codes Can be Used

The code stamped on the citrus may either be numerical or alphabetical. In this study two sets of self-inking stamps from "0" through "6" were used. This provided a code for a maximum of 7 types and sizes of grapefruit or oranges. If an alphabetical code is desired, it is suggested that such letters as A, I, O, S, X, and W be used in order to minimize questions regarding the correct code. It is not recommended that the actual price be placed on each unit since it would be necessary to show whether the price is per unit, per 1/2

dozen, or per dozen and would require large sets of self-inking stamps to handle all possible price variations.

To insure maximum productivity in the use of the citrus coder, it is suggested that the entire day's receipts be coded at one time. This eliminates setup and cleanup time which otherwise would occur when each case is handled individually. For example, when the crates of citrus are processed individually, it is necessary to position the coder, obtain and ink the stamps, and put away the stamps and coder for each crate handled.

The labor requirements for the complete handling of a crate of grapefruit, using the citrus coder and dumping the grapefruit on the display, are 4.54 man-minutes (PH-VG-3). This method of handling grapefruit is 60 percent more productive than the current typical method (code with crayon or grease pencil at display area and place on display by hand) and 40 percent more productive than the most productive of the conventional methods (code with self-inking stick stamps and display by hand). The use of the citrus coder for handling oranges required 4.56 man-minutes per crate which was 158 percent more productive than the typical method as noted above and 110 percent more productive than the most productive of the conventional methods. Plans for the coder are available through the Transportation and Facilities Branch, Agricultural Marketing Service, USDA.

BAG CLOSURE COSTS COMPARED

With the growth of produce prepackaging in retail food stores increasing, use is being made of transparent film bags. To insure that the original weight or number of units is maintained, the filled bags must be securely closed. Several methods of making these closures are currently in use in the food trades.

A recent study conducted by the Transportation and Facilities Branch, AMS, revealed that the combined labor and materials costs for the six illustrated methods of closing the bags varied from 0.26 to 0.57 cents per bag, with most of the difference due to the cost of the materials used. Except for one method, there was very little difference in the amount of labor required to perform the work. (PH-VG-4)

Generally, the sole function of the devices used to close transparent film-type bags is to seal in the contents. However, some types of closing devices also are used for price marking the bagged unit. Since most bags now are printed with a spot for the weight and price, there is little advantage to be gained from using the closure for the price mark. In each of the 6-bag closing methods studied, the operation consisted of: 1) twisting (or folding) the neck of the bag; 2) affixing the closing device, and 3) placing the filled bag in a master container.

Types of Closures Studied

In method "A" a pressure sensitive tape in a dispenser was used and two steps were involved: The twisted neck of the bag was positioned on the tape and depressed into the jaw of the machine which sealed the tape about the neck of the bag. It was removed from the jaw and the tape was cut off on a serrated blade. This machine dispenses tape either 1/2 inch or 3/8 inch wide.

In method "B" the twisted neck of the bag was inserted in the jaw of a jaw-type hand stapler and a staple placed around the bag. (Demonstrate)

In method "C" the neck of the bag was twisted and closed by a wire enclosed tape which was wrapped around the bag and twised tight (figure 3). The ends of the tape were then bent back. The tape is either plastic or paper (in different lengths) with a wire imbedded in the material. In this study, 4" plastic and approximately 5" paper tapes were used. There was no appreciable difference in time requirements. (The material costs in the table are based on the paper-type tapes.) (Demonstrate)

In method "D" a small metal clip was placed around the twisted neck of the bag and compressed tight by the thumb and forefinger. (Demonstrate)

In method "E" a plastic tag approximately 3/4" by 1 1/4" with a slotted opening was snapped on the twisted neck of the bag. (Demonstrate) This tag is large enough that the package price can be stamped or written on it.

In method "F" the top of the bag was folded over and a 2" by 4" price tag was placed over the fold and attached with a conventional desk or hand stapler. (Demonstrate) The price tag identifies the commodity, its weight, code, and price.

There is very little difference in the labor requirements for all methods other than "F". The size of the bag or the length of the neck has a greater effect on labor requirements than the type of closure. In several tests in which undersize bags were used, from 40 to 58 percent more labor was required to twist, close, and dispose of the bag than when the proper size bag was used (approximately 2 inches of bag above the closure). Furthermore, when the neck of the bag is too short, the chances of the closure coming loose are increased.

Labor and materials cost comparison for 6 types of closures for polyethylene type bags.

Type of Closure

	Without price tag				With price tag	
	A Pressure Sensitive Tape	B Staple	C Wire Enclosed Tape	D Metal Clip	E Plastic Clip	F Staple and Tag
Labor @ $1.20 hr.	.208	.248	.286	.234	.250	.550
Materials 1/	.050	.047	.079	.200	.197	.018
Total cost in cents per bag	.258	.295	.365	.434	.447	.568

1/ Basis of Material Costs:

A @ $0.43 per 60 yds and 2½" per bag

B @ "2.36 per 5000 box in 80 box lots

C @ $15.75 per 5000 and 5" per bag

D @ $2.00 per 1000 in 100 m lots

E @ $1.97 per 1000 in 1000 m lots

F @ $0.43 per 5000 in quantity lots - 2 per bag

Methods of Packaging Potatoes and Onions

There appears to be nearly as many methods and devices for bagging potatoes and onions in the retail food stores as there are enterprising employees. These range from filling the bags manually (PH-2x2-1) to filling with machines that make the operation almost completely automatic. Some of the most common methods found in retail stores and central warehouses, as well as improved methods, were studied and compared by AMS research workers. A comparison of 6 methods of bagging potatoes and onions in the retail store, and 2 methods of bagging potatoes in a central warehouse showed considerable differences in labor productivity and bagging costs among the various methods. (PH-VG-6)

The productivity of the potato and onion bagging operation in the retail store can be increased 41, 14, and 31 percent for 3-pound bags of onions and 5- and 10-pound bags of potatoes, respectively, when a lightweight aluminum scoop is used for filling the bags, as compared to filling them by hand. (PH-2x2-12) The use of a small automatic bagging machine (PH-2x2-13) in the backroom of the store increased production 60, 59, and 89 percent for 3-, 5- and 10-pound packages over the standard method of filling the bags by hand.

A comparison of the cost of store packaging with warehouse packaging of potatoes was made by analyzing all direct costs which were influenced by where the product was packaged. These preliminary results indicate that the most productive warehouse method studied costs 67.5 percent more than conventional hand methods in the retail store. This was due primarily to increased handling costs in delivery, a higher bag cost because of the need for a stronger bag in the warehouse, and the extra weight of potatoes needed in the bag to allow for shrinkage when bagging in the warehouse. Among other factors which will influence the decision whether to bag in the store or at the central warehouse are: 1) the relative sales appeal of the bag; 2) condition of the merchandise when it is placed on the shelf; 3) reduced labor requirements at store level; and 4) provision of adequate displays of bagged potatoes at all times. (For more complete information on this subject, consult AMS-12, "Some Comparative Methods of Packaging Potatoes and Onions.")

Trim Lettuce - "Leaves First"

What should be trimmed first, the butt or the bad leaves? That's a question retailers often ask when merchandising iceberg lettuce.

They generally believe that taking off bad leaves first and then slicing the butt saves more of the lettuce--but that slicing off the butt first and then taking off the bad leaves is faster and cheaper in trimming labor costs. (Demonstrate)

Marketing researchers of the Agricultural Marketing Service found that it is more profitable to take off the bad leaves first. They worked in 3 large super markets to determine which of these two most commonly used methods was more profitable.

The usual procedure in the stores studied was for the produce manager to divide the lettuce into 2 price lines based upon the size of the head. The lettuce was trimmed in the backroom and divided while it was being displayed. So differences in trimming methods that affect the size of the head directly affect the price received for the lettuce.

More Lettuce for Higher Price Line

When the leaves were trimmed first, about 12 percent more of the lettuce was merchandised into the higher price line. When the spread between the price line is 6 cents, lettuce trimmed "leaves first" yields about 17.5 cents per carton more. But it costs about 2.5 cents more per carton to do the trimming. So the net gain is 15 cents a carton when the lettuce is trimmed "leaves first." (PH-VG-7)

This gain is derived from a larger portion of the heads being merchandised into the higher price line. An important intangible gain comes from the fact that heads which do not change price lines are in better condition and so more readily salable. The amount of gain from this source was not measured.

Improved Methods of Displaying Produce on Wet Racks

The time required to display produce on iced wet racks in retail food stores can almost be cut in half by the use of improved display methods. Tests conducted by the U. S. Department of Agriculture in two Miami, Florida super markets reduced the time required to display 14 produce items by 39 percent.

Display time includes the activity of displaying and pricing performed at the display rack. It does not include the time to move to, within, and from the display area or pricing performed at any other point.

Improved Banding

Substantial savings resulted from an improved method of banding lettuce and celery--a reduction in time of 47 and 45 percent for the 2 items. (Demonstrate) The lettuce head is picked up with the left hand, butt up or in the palm, thumb up, at the same time the band is picked up with the right hand. With the head in the palm of the hand and held by the thumb, the four fingers are opened and the band placed underneath the head with about one-third of it ahead of the fingers. Holding the end of the band with the right hand, close

fingers of the left hand and clamp band to lettuce. Rotate left wrist to bring free end of band to meet end held in right hand. Grasp both ends and twist one full turn. (Place on display) Based on the average number of pieces priced and displayed per week in the test store this resulted in a saving of 3.1 man-hours a week.

Improved Handling

Additional savings in display time resulted from changing from the conventional method of displaying one piece at a time and passing it from hand to hand (PH-2x2-9) to an improved method of displaying two pieces at one time with one in each hand. (PH-2x2-10) Displaying with more than one in each hand reduced the control over positioning and required more additional time to straighten out the display than could be gained by the multiple carry. The decrease in display time varied from 14 percent for lettuce to 28 percent for corn.

Items that are price marked or banded as displayed will, of necessity, use a variation of the hand-to-hand pass method. Large bukly items, sudh as cabbage, cannot be handled easily one in each hand. Items that are price marked or banded at another point and then displayed can take advantage of the two-handed method. But banding or pricing as a separate operation will require some additional time because of the extra handling involved.

Proper Position of Container

Containers placed at a convenient working position alongside of rack will reduce display time further by shortening the distance traveled by the hands. It will also minimize extra body movements.

Taking Down the Wet Rack

A planned procedure for taking down the wet rack at night will prove of benefit to the work involved in resetting the rack the next morning. When the rack was pulled at night, items that required retrimming, such as lettuce, celery, and romaine, were stored in containers on a separate handtruck from items that could be replaced on display without trimming. Items that do not require retrimming can be moved directly to the display area and placed on the rack. This eliminates the additional time formerly required to bring all the produce that was taken off display the previous night to the floor and to sort through the mixed containers.

The standard time per week required to price and display the 14 items with conventional methods was 684.3 man-minutes, or 11.4 man-hours. With the improved methods, standard time per week was reduced to 418.7 man-minutes or 7 man-hours. The total time saved per store for the 14 items was 4.4 man-hours per week. (PH-VG-5)

Aisle Displays Affect Produce Sales

Sometimes it doesn't pay to increase produce display space in retail food stores. This is particularly true if display cases block customer traffic and prevent easy access to other produce counters.

In fact, item sales actually increased in a store cooperating in a marketing research study when the management removed 3 small aisle displays from the produce department.

The authors, marketing specialists, made these findings when they charted traffic patterns and actions of a random group customers. When the store management removed the aisle counters and displayed the produce elsewhere, customers purchased 16 percent more items. And the time the customers spent in the produce department shopping decreased 12 percent.

These improvements occurred even though counter space was reduced 48 square feet or 10.6 percent of the total display space in the produce department.

In the store situation studied, the use of aisle displays hindered the movement of customers. (PH-2x2-14) It prevented traffic from criss-crossing between the two long counters. And it affected the overall sales of the produce department.

Specifically, it raised a definite question of the desirability of produce "island" displays. (PH-2x2-15)

In addition, the study pointed up a rather new technique in studying layout and display problems. Store operators arrange their fixtures by a more or less trial and error method. Subjective assumptions and personal attitudes have influenced their placement.

Often the location of a special, or new, item display is decided by the availability of space, or it is decided by the area in which space could most easily be created. Usually, the new display has ended up right in the middle of the aisle.

Charting traffic patterns of a random sample of customers can develop an exact measure of customer habits. It is possible to evaluate the relative drawing power of a particular area of a store. Also, operators can measure the effect of customer traffic and congestion on the sales of a specific store area.

The technique is comparatively simple.

In the study of aisle displays, an observer stationed near the produce weighing station plotted customer paths. He made a random selection of customers for tracking, choosing the next person entering the produce department after the last one observed departed. He observed only one customer at a time.

The path the customer followed was traced on a layout sheet of the department. The observer marked each item purchased with an "x". He also recorded with a stopwatch the time the customer spent in the produce department.

At the end of each observation period, customer tracks were transferred from individual sheets to a master layout. This resulted in a composit plot of the paths and actions of each group of customers.

Previous AMS studies of a produce department, taken at regular intervals throughout the week, indicated that customer congestion was one of the major factors affecting traffic patterns. Thus, both slack and busy periods were selected for this study.

Twenty customers were traced in each of 3 time periods on Friday and 30 customers in a late-afternoon period on Tuesday. The same time periods and days were used in the "before" and "after" observations.

The assortment, quality, and prices of items offered for sale in the produce department remained essentially unchanged during the 2 weeks in which the study was made. With aisle displays in place, customer traffic concentrated along the vegetable-fruit counter.

Removal of the aisle displays allowed greater circulation of customers between the vegetable-fruit counter and the citrus rack opposite. It also increased sales in the citrus section.

A similar spreading out of customer traffic and increased shopping in the citrus-banana section was revealed in each of the four periods studied.

Interestingly enough, removal of the aisle displays caused a much greater increase in items purchased per customer on Friday than on Tuesday. When the "island" displays were not used, 19.7 percent more items were purchased per customer on Friday and only 5.2 percent more on Tuesday.

This suggests that the aisle displays adversely affected the item purchases in direct proportion to the amount of customer traffic and the resultant congestion around the displays. Further, both the Tuesday and Friday observation periods showed that most of the increase "without aisle displays" was accounted for by added sales from the adjacent citrus-banana counter.